Also $\gamma = \alpha\beta/2 = 16.0870$. The coefficient δ is unity, which is a little unfortunate since it might lead to the erroneous impression that we were *defining* unit force as that force which gives unit acceleration to unit mass. Our choice of unit acceleration has probably been injudicious.

Enough has been given to illustrate the principle which we feel sure ought to commend itself to every one who once grasps the fundamental independence of all dynamical concepts and the strictly proportional nature of the dynamical equations, all of which are merely the algebraic formulation of experimental evidence. In extenuation of our introduction of a new set of numerical constants to be memorized we can only point out that there were many "$\frac{1}{2}$'s" "4π's," etc., there already and that we entirely do away with the troublesome and useless subject of dimensions.

The new system is not fully developed as yet, however, and until it is we have found ourselves compelled to make the best of the old one. We dodge the ambiguity in the "ambiguous words 'weight' and 'mass'" by the artifice of defining them. We adopt and we teach the convention that "mass" shall be an exact equivalent for "quantity of matter," and that "weight" means the gravitational *force* upon a mass. We teach that the *measure* of a force (wherever the *concept* of force may originate) may conveniently be defined by the equation $F = ma$. We teach that it is a remarkable law of nature, determined only by experiment, and not to be suspected *a priori*, that the "body factor" in this equation is strictly proportional to the weight for all bodies in the same uniform gravitational field. We point out that pounds-mass and pounds-weight (*i. e.*, pounds-force) are totally different things, and that there are 32.2– of the units of force defined by the equation $F = ma$ in a pound-weight and that therefore all forces deduced in dynamical equations must be divided by 32.2 if we wish to express them in terms of pounds-weight, much as one would reduce centimeters to feet. Conversely, all forces given in pounds-weight must be multiplied by 32.2 before they can be used in dynamical equations. We teach that the fundamental idea of the gravitational constant g is force per unit mass and that it is also of the nature of an acceleration in virtue of the relation $F/m = a$. We hold that dynamics *may* be developed without the introduction of arbitrary constants by the assumption of three fundamental units and defining all the others in terms of these three. We object to Professor Kent's description of a system with four fundamental units as a "foot-pound-second" system instead of a "foot-pound-second-pound" system, and to his ridicule of the "gee-pound" or "slug" in the same letter in which he says, "It has been found convenient to use the letter m instead of W/g." What is the *unit* of m if not the "slug"? We frankly talk about a unit of force called a poundal as a matter of convenience, and we measure it by a defining equation much as we measure a unit of velocity or of work. We consider this term preferable to the "pound-foot-per-second-square," and venture to hope that there may some day be introduced shorter names for the "foot-per-second-per-second" of acceleration and the "pound-foot-square" of moment of inertia.

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ANOTHER STATE PARK NEEDED

TO THE EDITOR OF SCIENCE: Two or three notes of interest have appeared in SCIENCE regarding the new state reservation at Jamesville, Onondaga County, New York, which includes the glacial lake, sometimes known as West Green Lake. This little lake is of especial interest owing to its history as the site of the plunge basin of a great glacial waterfall, and also because in its environs is found the hart's tongue fern (*Phyllitis Scolopendrium*) which probably ranks as the most interesting and rarest fern in the United States.

Now it is proposed to acquire another lake of identical geological history, East Green Lake (also known as Blue Pond, and *Scolopendrium* Pond), which lies about a mile east of the west lake above mentioned. The pro-

posal was first made in the correspondence columns of a Syracuse paper, the *Post-Standard,* and has since been taken up by local people until there is considerable possibility of its ultimate success. A committee of representative business men has been appointed to further the project.

The matter is here brought to the attention of readers of SCIENCE in order to ask that any who can help may be moved to use their influence with state officials or any others who might render help. East Green Lake and the surrounding region represent a larger and wilder tract of land. The lake itself is of equal geological interest and from the standpoint of the hart's tongue fern, is of greater interest than the west lake region because the best specimens in the country grow near the east lake. The west lake preserve includes only seventy acres, as this was all that was of special value as park. In the east lake region it is proposed to acquire two square miles to include not only the lake plunge-basin itself but also a marl-bottomed lake nearby and additional acres of beautiful woodland.

The preservation of the best stations for the hart's tongue fern, probably the rarest and most interesting fern in North America, is sufficient reason for urging the acquirement of this proposed new park. Besides this species there are other ferns to the number of about forty, making it probably the best fern preserve in the country. The need of prompt action is indicated by the fact that a lime development company now holds an option on the tract desired.

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SCIENTIFIC BOOKS

Theory of Measurements. By JAMES S. STEVENS, Professor of Physics in the University of Maine. New York, D. Van Nostrand Company. 1915. Pp. vii + 81. Price $1.25 net.

This little book is intended to fill the gap between the fragmentary treatment of the errors and adjustment of measurements, found in most laboratory manuals, and the detailed discussions given in formal treatises on the theory and precision of measurements. In eight short chapters, the author deals with the following topics: Measurements and Errors; Probability, including a discussion of the probability curve and integral; Adjustment of Observations; Precision of Measurements; Propagation of Errors, applied to direct and inverse problems; Plotting; Negligibility, including rules for the use of significant figures; Empirical Formulæ and Constants.

The methods and notation adopted are similar to those employed in Merriman's "Method of Least Squares" and Holman's "Precision of Measurements." The treatment is necessarily abridged to comply with the limits set by the scope of the book but the usual formulæ and methods are developed in sufficient fullness for their practical application by the intelligent student. Possibly owing to his desire to save space, the author gives very little discussion or explanation of the fundamental principles and assumptions underlying his mathematical derivations. Consequently the true significance of his results is not always apparent and the conditions essential for their correct application are apt to be overlooked. For example, the deductions from the law of accidental errors do not apply to a series of observations affected by systematic errors but the author has nowhere pointed out the necessity of considering such errors in connection with the discussion of precision.

Definitions and problems are frequently so briefly and inadequately stated that the unaided student is apt to misinterpret their meaning. The following quotation is a fair example: "Measurements are usually classified as follows: 1. *Direct*—when, for example, a distance is measured with a tape line. 2. *Indirect*—when the density of a cylinder is determined by measurements of its length, diameter and mass. 3. *Conditioned*—when the third angle of a triangle is restricted by the values of the other two angles. Measurements not so conditioned are called *independent.*"

However, with the aid of a competent teacher, the student should be able to make profitable use of the book in connection with